

CLAIMS

1. (Currently Amended) A heterojunction bipolar transistor (HBT), comprising:

successive emitter, base and collector layers,
an InP sub-collector layer, and
a thermally conductive InGaAs contact layer
between said collector and sub-collector layers,

said contact layer being thin enough to have a
lateral conductivity inadequate for it to function by
itself as a contact to the collector layer, but
functioning as an electrical conductor between said
collector and sub-collector layers,

wherein said contact and sub-collector layers
extend lateral to said collector layer.

2. (Original) The HBT of claim 1, said contact layer
having a thickness not greater than about 500 Angstroms.

3. (Original) The HBT of claim 2, said contact
having a thickness in the approximate range of 100-200
Angstroms.

4. (Cancelled)

5. (Currently amended) The HBT of claim 4 1, further
comprising a contact pad on said contact layer lateral to
said collector layer for establishing a contact to the
collector layer through the contact and sub-collector
layers.

6. (Original) The HBT of claim 1, wherein at least a
portion of said sub-collector layer lateral to said
collector layer is electrically insulative to
electrically isolate said HBT.

7. (Previously Presented) A heterojunction bipolar transistor (HBT), comprising:

successive emitter, base and collector layers,
an InP sub-collector layer, and
a thermally conductive InGaAs contact layer
between said collector and sub-collector layers,

wherein at least a portion of said sub-collector layer lateral to said collector layer is electrically insulative to electrically isolate said HBT, and said sub-collector layer extends laterally beyond said contact layer and said insulative portion of the sub-collector layer is lateral to said contact layer.

8. (Original) The HBT of claim 6, said insulative portion of the sub-collector layer including implanted ions and associated trapped conductors.

9. (Currently Amended) A double heterojunction bipolar transistor (DHBT), comprising;

an InP or InAlAs emitter,
an InGaAs base,
an InP or InGaAs collector,
an InP sub-collector, and
an InGaAs contact layer between said collector and sub-collector which establishes, together with the sub-collector, a low resistance contact to the collector, said contact layer being thin enough to provide a substantially higher thermal conduction path between said collector and sub-collector than would bulk InGaAs, and to have a lateral conductivity inadequate for it to function by itself as a contact to the collector,

wherein said contact layer and sub-collector extend lateral to said collector.

10. (Original) The DHBT of claim 9, said contact layer having a thickness not greater than about 500 Angstroms.

11. (Original) The DHBT of claim 10, said contact layer having a thickness in the approximate range of 100-200 Angstroms.

12. (Original) The DHBT of claim 9, wherein said contact layer is doped N+.

13. (Cancelled)

14. (Currently Amended) The DHBT of claim ~~13~~ 9, further comprising a contact pad on said contact layer lateral to said collector.

15. (Currently Amended) The DHBT of claim ~~13~~ 9, wherein at least a portion of said sub-collector lateral to said collector is electrically insulative to electrically isolate said HBT.

16. (Previously Presented) A double heterojunction bipolar transistor (DHBT), comprising:

- an InP or InAlAs emitter,
- an InGaAs base,
- an InP or InGaAs collector,
- an InP sub-collector, and
- an InGaAs contact layer between said collector and sub-collector which establishes, together with the sub-collector, a low resistance contact to the collector, said contact layer being thin enough to provide a

substantially higher thermal conduction path between said collector and sub-collector than would bulk InGaAs,

wherein said contact layer and sub-collector extend lateral to said collector, at least a portion of said sub-collector lateral to said collector is electrically insulative to electrically isolate said HBT, said sub-collector extends laterally beyond said contact layer, and said insulative portion of the sub-collector is lateral to said contact layer.

17. (Original) The DHBT of claim 15, said insulative portion of the sub-collector including implanted ions and associated trapped conductors.

18-32. (Cancelled)

33. (Currently Amended) A heterojunction bipolar transistor (HBT), comprising:

successive emitter, base and collector layers,
an InP sub-collector layer, and
a thermally conductive InGaAs contact layer
between said collector and sub-collector layers,
wherein said contact and sub-collector layers
extend lateral to said collector layer.

34. (Previously Presented) The HBT of claim 33, said contact layer having a thickness not greater than about 500 Angstroms.

35. (Previously Presented) The HBT of claim 34, said contact having a thickness in the approximate range of 100-200 Angstroms.

36. (Cancelled).

37. (Currently Amended) The HBT of claim ~~36~~ 33, further comprising a contact pad on said contact layer lateral to said collector layer for establishing a contact to the collector layer through the contact and sub-collector layers.

38. (Previously Presented) The HBT of claim 33, wherein said sub-collector layer includes a functional portion aligned with said collector layer, and an electrically insulating portion lateral to said collector layer and outside the area of said functional sub-collector portion to electrically isolate said HBT.

39. (Previously Presented) The HBT of claim 38, said insulating portion of the sub-collector layer including implanted ions and associated trapped conductors.

40. (Currently Amended) A double heterojunction bipolar transistor (DHBT), comprising;

an InP or InAlAs emitter,

an InGaAs base,

an InP collector,

an InP sub-collector, and

an InGaAs contact layer between said collector and sub-collector which establishes, together with the sub-collector, a low resistance contact to the collector, said contact layer being thin enough to provide a substantially higher thermal conduction path between said collector and sub-collector than would bulk InGaAs,

wherein said contact layer and sub-collector extend lateral to said collector.

41. (Previously Presented) The DHBT of claim 40, said contact layer having a thickness not greater than about 500 Angstroms.

42. (Previously Presented) The DHBT of claim 41, said contact layer having a thickness in the approximate range of 100-200 Angstroms.

43. (Previously Presented) The DHBT of claim 40, wherein said contact layer is doped N+.

44. (Cancelled)

45. (Currently Amended) The DHBT of claim ~~44~~ 40, further comprising a contact pad on said contact layer lateral to said collector.

46. (Currently Amended) The DHBT of claim ~~44~~ 40, wherein at least a portion of said sub-collector lateral to said collector is electrically insulating to electrically isolate said HBT.

47. (Previously Presented) The DHBT of claim 46, said insulating portion of the sub-collector including implanted ions and associated trapped conductors.